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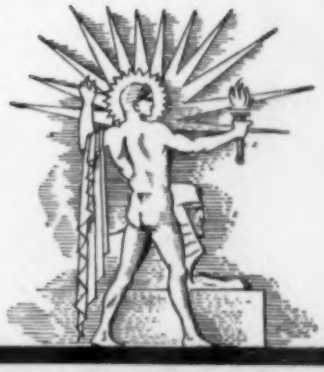
SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



JULY 15, 1933

Rare Survivors of Captive Breeding

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The Weekly Summary of Current Science

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DO YOU KNOW?

Celluloid was something new in 1869.

At least 2,500,000 persons in the United States suffer from hay fever.

The explorer Rasmussen once drove 94 miles with dog sledges in one day.

An albino buffalo was born this spring on the National Bison Range in Montana.

The recent flight over Mount Everest has shown the existence of two previously unknown glaciers.

Scientists report that a new disease of tobacco, brown root rot, can be controlled by rotating crops.

Canned baked apples add another ready-to-serve food to the rapidly growing list offered to customers.

Ancient Egyptian writings on leather, heretofore unreadable, have been brought back to visibility by infra-red photography.

At a hospital for animals in New York City, 50 per cent. of the operations are for removal of tumors and a third of these prove to be cancer.

Giant hailstones sometimes weigh several pounds.

It is 150 years—1783—since the first balloon flight was made.

About two-thirds of the hay fever cases occur in the fall.

It is estimated that 35 per cent. of all night accidents are due to poor light.

Some varieties of banana leaves are so waxy that they are used for waxing floors.

In the Far East, frozen cream drinks were popular as long ago as the fifth century BC.

An iceberg more than 60 miles long was sighted in the Antarctic in 1930 by explorers.

On the island of Madagascar, babies born on unlucky days were destroyed, until about fifty years ago.

Ants on peony buds are not destructive, but are merely gathering the sweet liquid exuded by the buds.

Vienna's weather history includes one hailstorm that broke a million window panes in a few minutes.

WITH THE SCIENCES THIS WEEK

AGRICULTURE

How large is a banana seed? p. 39. *The Banana—Philip Keep Reynolds—Houghton Mifflin*, 1927, $2.

Where are grasshoppers at their worst? p. 41.

ASTRONOMY

How dense is the companion of Sirius? p. 47. *Astronomy for Everybody—Simon Newcomb—Garden City*, 1932, $1.

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What is the Government expenditure for war likely to be during this year of peace? p. 35.

GENETICS

How can heredity of mental disease be demonstrated? p. 40. *Heredity in Man—R. Ruggles Gates—Macmillan*, 1929, $6.

GEOLOGY

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MEDICINE

What kind of fertilizer will prevent goiter? p. 46. *Goiter Prevention and Thyroid Protection—Israel Bram—F. A. Davis*, 1928, $4.

PHYSICS

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What research was being done in Uncle Sam's only photographic research laboratory? p. 37.

With what may the energy of cancer treatment radiation be compared? p. 40.

PHYSICS—BOTANY

How has measurement of "M" rays been accomplished? p. 40.

PHYSIOLOGY

What causes airsickness? p. 40.

PUBLIC HEALTH

Why are Government scientists finding it necessary to spend time washing test tubes? p. 36.

These curiosity-arousing questions show at a glance the wide field of scientific activity from which this week's news comes. Book references in italic type are not sources of information of the article, but are references for further reading. Books cited can be supplied by Book Dept., Science News Letter, at publishers' prices, prepaid in the United States.

THE NATION is engaged in warfare, a struggle against the disruptive forces let loose during peace times, an economic battle with poverty in the midst of plenty. It is a war being fought on behalf of the nation by the "new deal."

There is great apprehension in Washington in Uncle Sam's Scientific establishments. The word is being passed along that the ammunition is failing.

Less than a cent of every dollar spent by Uncle Sam in normal years is used in the fruitful battle waged by scientific research. Scientific research activities cost only $42,000,000 in that peak year of 1932. The appropriations of the last pre-Roosevelt Congress intended to be used for research in the year beginning July 1 were some $35,000,000.

But economy is the slogan and the axe of Budget Bureau Director Lewis Douglas is falling heavily. It appears that about $10,000,000 of the already reduced scientific research funds have been lopped off under President Roosevelt's economy act power conferred by Congress.

To support all the scientific research activities of the Federal departments, which solid figures show return thousands of per cent. profit in public service, only about $25,000,000 will be available, a reduction of over 30 per cent. from the 1932 funds. Hundreds of researches will be stopped, hundreds of scientists have been dismissed or have had their already nominal compensation reduced to dangerously low levels. Spirits are being broken, a condition that is even more dangerous than empty stomachs.

Science suffers. For the insects that menace our food supply, for the diseases that threaten our lives, for the industrial gods of waste and ignorance who shiver when scientists investigate, it is a noble victory.

For the next generation, it is dangerous defeat.

The SCIENCE NEWS LETTER presents upon the next five pages some factual information about the science situation in Washington.

GENERAL SCIENCE

Many More Millions for War But Curtailment for Science

"Economy" Slashes Net a Total of $10,000,000 From Science Budget, While Half a Billion May Go to War

FOR PUBLIC WORKS and other emergency measures to combat the depression, the Federal Government plans to make a capital expenditure of some $3,600,000,000.

As an "economy" measure, the Federal Government under the economy powers of the President and the Budget Bureau director, is effecting "savings" of $10,000,000 in the scientific research and service work of the regularly established, permanent bureaus.

Contrast these cross currents under the new deal.

A minor item in the public works program is the construction and modernizing of warships and Navy Yards at the cost of $354,000,000, an expenditure more than 35 times the "savings" being made in scientific research.

A minor suggested item in the public works program is the mechanization and rehabilitation of the army, estimated to cost about $200,000,000, which is about 20 times the "savings" in scientific research.

Some $13,000,000 is urged to be spent from public works funds on "ammunition for the army." This fund to keep our arsenals full of explosives would more than restore the disastrous "economy" cuts being made in scientific research and service.

War, past and future, has always been the glutton in government cost. In recent years, war, past and future, has absorbed some 70 per cent. of the total expenditures of the Federal Government. Scientific research and service has accounted for only a fraction of one per cent. of the total federal expenditures.

Under the so-called economy program of the Roosevelt administration, the expenditures for scientific research and service are being cut to about sixty per cent. of what they were in the 1932 fiscal year. The millions of dollars poured into military activities, past and future, have suffered no decrease but will be increased greatly according to present indications. It seems probable that at least $500,000,000 of the public works funds will be devoted to the army and navy, so that in the years of peace 1933-34, the military expenditures of the United States will rise to high levels.

Without any pacifistic discussions of these large military expenditures from public works funds, it is being argued in scientific circles that the drastic cuts in scientific research and service in the Federal Government departments are fully as dangerous to Uncle Sam's military establishment as actual curtailments in military funds would be.

At the outbreak of the World War, the National Bureau of Standards, the nation's greatest scientific bureau, practically became a military bureau, for example.

If the cuts in scientific research to the extent of $10,000,000 could be restored by the assignment of public works funds to this purpose, and if further another $10,000,000 were made available for the emergency employment of unemployed scientists, estimated to number 10,000 to 15,000 throughout the nation, the advocates of scientific preparedness feel that this investment of public works funds in science would be in the long-run far more fruitful than an equivalent expenditure of money for purely military purposes.

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GENERAL SCIENCE

Need Public Works Funds To Restore Science Work

A FEW MILLIONS of dollars of the $3,300,000,000 public works funds are being sought by government bureaus in order that the harm to the Government's scientific research work done by "economy" cuts will in part be mitigated.

Secretary of Commerce Roper has announced applications to the Public Works Board for grants that include:

For Bureau of Standards, $450,000; Bureau of Mines, $275,000; Bureau of Fisheries, $1,072,474; Coast and Geodetic Survey, $3,500,939; Bureau of Lighthouses, $2,355,068. These funds are sought for "new projects" and if obtained it is expected that many of the scientific personnel furloughed for reasons of Budget Bureau "economy" slashes will be put back to work.

It is unofficially estimated that about half of the 380 Bureau of Standards employees whose pay stopped July 1 might be allowed to continue their important scientific tasks if the $450,000 public works funds are granted. The Bureau of Standards was severely cut by the Budget Bureau deductions from 1934 appropriations, being allowed only $1,363,000 instead of about $2,000,000 appropriated by Congress. The Bureau of Standards is also expected to play an essential part in the gigantic public works construction program by testing materials purchased. If this work can not be done because of lack of funds, there is the possibility of the Government's losing millions of dollars due to inferior materials used by contractors.

Essential safety work and fundamental research for the mining industry of the Bureau of Mines will be rescued if the funds are granted that bureau.

Similarly it is contemplated that the coastal mapping and triangulation work of the Coast and Geodetic Survey can be speeded up with employment of engineers and other technical men now out of jobs due to the depression. The Bureau of Fisheries sees possibilities of serving the public good by expansion of its fisheries conservation and propagation work.

Reconditioning Projects

Applications have also been filed by Secretary Roper for public works funds for reconditioning projects; Aeronautics, $487,500; Coast and Geodetic Survey, $79,200; Bureau of Fisheries, $230,000; Bureau of Lighthouses, $2,283,920; Navigation and Steamboat Inspection, $30,000; Bureau of Standards, $148,500. These funds will be for repairing and modernizing buildings and equipment and are not expected to aid materially in salvaging abandoned scientific research.

Although no formal applications have been made by Secretary of the Interior Ickes for public works funds for carrying on some of the curtailed activities of the Geological Survey, which has also been hard hit by the economy program, such grants may be sought. Secretary Ickes has announced his determination to attempt to secure jobs for furloughed employees of his department with some of the new agencies of the government.

The effect of the economy program on the Department of Agriculture's many research projects is not yet known. Changes are being made slowly in that department and its may be several weeks before the details will be known. It is known that Secretary Wallace is determined that the scientific research of the department shall not be disrupted by the economy program.

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On The Science Front In Washington

PUBLIC HEALTH

Federal Health Research Slowed by Dismissals

THE SCIENTIFIC investigations into the causes and methods of fighting disease which are being carried on by the U. S. Public Health Service will be considerably slowed but not badly hurt by the dismissal of employees as an economy measure.

None of the key people in the research program is being dismissed, Dr. L. R. Thompson, assistant surgeon general in charge of scientific research, stated.

At the National Institute of Health, formerly the Hygienic Laboratory of the Service, not more than eight or nine employees are being dismissed. These are laboratory attendants. Altogether between thirty and thirty-five employees in Dr. Thompson's division are being dropped as an economy measure, but most of these are married, their husbands or wives being employed by the government. Some of these were part-time workers on problems of child hygiene. Most of them were technical assistants. None of the highly trained scientists has been dropped.

As a result, the scientists will have to do their own dirty work, such as washing test tubes and preparing stock reagents. This will slow them in their investigations, but it will not stop them.

True to its traditions of self-sacrificing service, this branch of the government is making no complaint over the situation and is cheerfully preparing to carry on its important work in spite of all obstacles, such as lack of technical assistance.

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GEOLOGY

Geological Survey Loses Men of International Fame

BUDGET BUREAU slashing of funds for scientific purposes will cause the loss to the Government service of a galaxy of geologists of national and international reputation.

Some of these have been in the U. S. Geological Survey for more than thirty years, and so are eligible for the retirement annuity. Others, younger men, will have to be dismissed without that amelioration of circumstances.

It is not yet known just how high the total of dismissals will be, but about 150 have already been added to the army of the scientific unemployed from the Survey. Present plans are taking into consideration the possibility that the new public works program will turn over some funds to the Geological Survey. In case money is not made available from this source the dismissals now will only mark the beginning of the disruption of the Government's staff of geologists.

Dr. Arthur Keith, treasurer of the National Academy of Sciences, and representative of the United States at many international scientific meetings, is one of the distinguished men slated to go. His specialty has been the structure of the earth, and his research has given the world fundamental information for the understanding of earthquakes.

Ore Expert Lost

The Government loses an expert on rocks, ores, and minerals, with the letting out of George Steiger. Mr. Steiger has been with the Geological Survey since 1892. The chemical and physical laboratories in the Interior Building are the result of his planning.

A specialist in the examination of minerals in well cuttings from the recently discovered potash fields of Texas and New Mexico is lost in Frank Cath-

cart Calkins, who has been with the Survey since 1901.

A leading authority on deep earth temperatures particularly as related to important oil fields goes with the leaving of C. E. Van Orstand.

Dr. Nelson Horatio Darton's contributions have been in the geologic and topographic mapping of the southwestern part of the United States. For this work he has been awarded the Charles P. Daley medal of the American Geographical Society.

Dr. Arthur Coe Spencer is a specialist on mine deposits and has also investigated dam and reservoir sites.

Louis M. Prindle is an expert on the complex geology of northwestern Massachusetts and adjoining states.

Dr. Charles Butts is a stratigraphic geologist.

Dr. George Burr Richardson, a specialist in oil and gas and in the mapping of oil and gas fields of the United States, has also served the Internal Revenue Bureau for special investigations in connection with the valuation of oil and gas properties.

Arthur James Collier is an authority on coal, petroleum, and gold deposits.

These men are typical of those that the government service is sacrificing in the name of economy.

International Congress

By unhappy coincidence this "economy" attack on the U. S. Geological Survey comes at a time when America is host to foreign geologists. The International Geological Congress meets in Washington during the last week in July. Not a cent of Government support is given this meeting, although foreign governments have subsidized previous congresses held in their countries. Uncle Sam's greeting to the foreign geologists comes in the form of dismissals to some of their colleagues who will act as hosts.

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PHYSICS

Cuts Destroy Uncle Sam's Photographic Laboratory

UNCLE SAM has fired his experts on the making of photographic films. In the interests of "economy" dollar saving, the Government will scrap a laboratory which it has taken a decade to build and which could not be duplicated except at immense cost in time and money.

All the Government saves by this move is less than $10,000 a year. Thousands, not millions! Less than half of the initial cost of one of the Air Service's photographic planes! Yet with this Bureau of Standards laboratory gone, the plane and all other military and civil photographic outfits of the Government will depend entirely upon the few commercial film companies in this country for knowledge regarding the emulsions they must use. In peace time, this is a serious situation. In war time, it might be disastrous.

Only Research for Public

With the laboratory, goes Dr. Bert H. Carroll, young physical chemist, who has had the distinction of being the only scientist in this country to do research work for the public on the important subject of the making of the emulsions that make photographic films sensitive. He is one of the very few men in this country outside commercial film companies who are familiar with the subject. With him also goes Dr. Donald Hubbard, who has been in the laboratory for seven years rated as a "junior chemist" although qualified as a specialist in this field.

The making of emulsions for films has always been considered an art. The men who could do it have guarded their skill as a trade secret, and have passed it on to others only in the same company. Even they have great difficulty in making the emulsions in case they move to another plant and have to work under different conditions, because the underlying principles have not been understood. Even the most modern emulsion plant when it moves from place to place usually takes more than a year to get going again.

When the United States was faced with the World War, the importance of aviation photography became evident. We had to have photographs, from the air, of the enemy lines. This meant that we had to take photographs at long range. We had to take them with short exposures. We had to take them through the mists which invariably lie between a high flying plane and the ground. And we had to have results that would show details clearly.

This meant, in turn, that we must have better films. Films sensitive to the red end of the spectrum were an absolute necessity.

Then the Government discovered within the service, in the spectrographic laboratory at the Bureau of Standards, experts on the sensitization of plates or film to the red. Research was started which resulted in the hypersensitization process used for ten years by the air service.

In 1922, funds were transferred from the air service to the Bureau of Standards for research on making films more sensitive, and particularly on the making of new and better emulsions.

It was necessary to build from the ground up. Nothing recent existed in print on the subject of emulsion making. Dark secrecy surrounded the whole subject. Even today, no university in the land is doing research on this subject. No laboratory in a public institution had undertaken it.

Even in the commercial research laboratories, the work has been extremely limited. Manufacturers have produced dyes which are added to the emulsion to make it sensitive to the red end of the spectrum, but they have published extremely little which dealt with anything remotely connected with making of the emulsions themselves.

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AVIATION

Public Safety In Air Endangered By Slashes

GOVERNMENT CUTS in the name of economy are endangering public safety in the air.

The U. S. Department of Commerce issues certificates for approved types of airplane engines. In June, 1933, this meant that the engine stamped with this mark of Uncle Sam's approval was of a safe and practical type. It meant that the engine had been tested by experts of the National Bureau of Standards in the government's own testing plant at Arlington, Va.

Manufacturer's Test Accepted

But in July, 1933, and thereafter unless funds not now provided for this purpose are forthcoming, Uncle Sam's certificate will mean something entirely different. It will mean that the manufacturer, not the government, has tested the engine. The tests will be conducted in the plant of the manufacturer, by persons in the employ of the manufacturer, with the manufacturer's testing equipment. A single government inspector visiting the plant will be expected to insure that test conditions are satisfactory.

Some aviators, who have to trust their lives to their motors, have expressed the opinion that a government certi-

ficate under such conditions would be decidedly misleading.

The first motor given an approved-type certificate by the Department of Commerce was tested by the manufacturer, and was approved by the Department on the basis of the manufacturer's statement. Later it was discovered that the motor had so much vibration as not to be practical to fly.

Consequently, for the next test, a Bureau of Standards expert, T. T. Neill, who has since been in charge of this testing work, was sent to the manufacturer's plant to supervise the testing. The third motor was tested at the Bureau's own plant.

Only $60,000

This testing work, insuring the safety of fliers and the flying public, has cost the government an average of about $60,000 a year. To save this sum, the work is being discontinued. Four engineers, four skilled aviation engine operators, and eight other skilled workers are being fired. Apparatus recently installed at Arlington at a cost of $50 000 will remain idle as will also special equipment for the testing of air cooled engines under approximated altitude conditions, which represents another investment of about $35,000.

Meanwhile experienced men are being lost to the government, who will probably have to be replaced when public pressure demands the renewal of this public service. The present arrangement of testing in the manufacturers' plants makes no provision for the small manufacturer who has not the expensive testing equipment necessary to meet department requirements.

As a last minute job, the men who have been fired rushed through two tests, each requiring 100 hours continuous running of the motor. This meant that a group of men being fired from the government service in a time of general unemployment worked night and day for eight consecutive days up until almost the moment of leaving.

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AVIATION

Altitude Laboratory Idle For Lack of Funds

THE ALTITUDE LABORATORY of the National Bureau of Standards, the only one in this country, and the only one in the world doing published research for the benefit of the public, will stand idle during the coming fiscal year because of lack of funds.

Unless funds are made available from public works projects to renew the work there of testing airplane motors on the ground under conditions like those at high altitudes, this laboratory representing an investment of about $250,000 will not be used for the public service—simply because there is no money for the purpose.

When a manufacturer, or the Army or Navy, wants to know how a particular motor will operate at very high altitudes—or wants to know about the performance of a certain fuel or lubricant—it has been possible to make tests in the altitude chamber of this laboratory. Here the atmospheric pressure can be varied at will, as well as the temperature, the percentage of moisture, and other factors which are different at different heights above sea level. In other words the entire motor can be transported to conditions like those of any height up to 30,000 feet while the investigators remain on the ground and make observations of its performance.

Impossible To Manufacturer

No manufacturer is able to make such a test in his plant. He depends upon tests made when the pressure of the air fed to the carburetor is controlled. He has no way of controlling the pressure at the exhaust outlet, or the many other factors which affect the engine when it is actually in flight. None, that is, except the very unsatisfactory method of actually putting the motor in a plane and taking her up.

The U. S. Navy has facilities for controlling the pressure both at the intake and at the exhaust, but even they must rely on these approximate tests.

The plans of the altitude laboratory for the coming year included the working out of a correction factor which might be applied to such approximate tests to give some idea of what the performance would be when the motor was actually at altitude. So far no such correction factor is known. Yet the requirements of the Department of Commerce for altitude engines specify that they must be given either actual altitude tests or approximate altitude tests "corrected in a proper way."

The physicist in charge of the altitude laboratory who is being summarily fired without notice, or, technically speaking, "furloughed for an indefinite period," left industry during boom times to make a career of this work. He has now had five years' experience in the laboratory.

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AGRICULTURE

Experiment Station Funds Uncut for Three Months

THE AGRICULTURAL experiment stations of the various states will not have their federal funds cut by 25 per cent., at least during the first three months of the new fiscal year.

President Roosevelt's reorganization order chopped this regular annual appropriation by $1,095,222 for the year beginning July 1, but the great damage that would result to fundamental research work in science and agriculture caused official postponement of the ordered cuts for the first quarter of the new fiscal year. There is hope that the cuts can be mitigated for the balance of the year also.

Although final action has not yet been taken, similar postponement of the 25 per cent. cuts in agricultural colleges and vocational education federal grants was made to apply to the first quarter.

The agricultural extension service has received full payment for the first half year.

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METALLURGY

Information Service on Metallurgy Closed

THE SCIENTIFIC staff which is being fired by the United States Government does not consist of long-haired men with peculiar notions. Neither are they individuals with low efficiency ratings or those whose services are rated by superiors as unnecessary. They are being dismissed, or "separated" and "furloughed" for one reason only—lack of funds. That is, in order to save the small amount of their salaries for use on such things as public works.

Typical of young woman scientists who are being dismissed is Miss Marjorie G. Lorentz, research worker on metallurgy at the National Bureau of Standards.

When builders suspect a flaw in the metal to be used, say in building a new airship or in withstanding the stress of a great building, they may test it by an etching process. They take a cross section of the metal, treat it with the right reagent, and then photograph it. The photograph, because of the action of the reagent, will show up occlusions, or imperfections, and also the shape of the metal particles.

Miss Lorentz has experimented with many sorts of metals and reagents and has made convenient tables showing the best reagent for use with each metal for each purpose. These have been published as scientific papers of the Bureau. So that now, the man who wants to test a piece of copper may just look at the table under copper and learn exactly what is best for his purpose.

Information Center

Miss Lorentz also runs a sort of center or exchange of information of all sorts on the subject of metallurgy. She abstracts all current publications on this subject and indexes them in an up-to-the-minute file. This is probably the only such information file on metallurgy open to the public in the United States. She answers letters of inquiry from the public at the rate of over one hundred every month, and has daily many other requests for advice and data by telephone and personal calls. To meet repeated requests for the same data, she has compiled books on several metals.

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AUTOMATIC CHEMISTRY EXPERIMENT

Every two minutes at a booth in Chicago's Century of Progress Hall of Science the famous thermite reaction used in one kind of welding is performed to show the principle of chemical exchange or double decomposition. Iron oxide is mixed with aluminum dust and when the mixture is ignited there results molten iron and aluminum oxide with the evolution of great heat.

AGRICULTURE

Disease Resistant Banana Promises to Save Millions

VICTORY over the dreaded Panama disease which has cost banana growers millions of dollars in the last few years appears to be within measurable sight of achievement, according to experiments carried out by Prof. E. E. Cheesman, M.Sc., A.R.C.S., of the Imperial College of Tropical Agriculture, Trinidad.

Prof. Cheesman believes he has created a fruit which is completely immune to Panama disease and at the present time samples are being sent out to growers for further and more complete tests. Known as 1.C.2, the new variety has been planted alongside trees severely stricken with Panama disease in the grounds of the agricultural college here, yet no sign of the disease has been found.

In March, 1925, a variety known as 1.C.1, was evolved and this plant has proved to be completely resistant to Panama disease following continual close investigation ever since, but it has the grave commercial disadvantage that an occasional seed is noted as a result of self-pollination when multiplied up by suckers and grown under ordinary banana field conditions.

The primary economic end kept in view throughout the investigation has been the production of a new variety of banana combining resistance to Panama disease with the good commercial qualities of Gros Michel, outstanding variety of northern markets.

Experiments carried out so far by Prof. Cheesman have shown that the new variety, 1.C.2, is completely seedless while it is hoped to produce fruit of a good size. Furthermore, it is hoped that it will have the other necessary required commercial qualities such as compactness of bunch, a fruit skin not abnormally sensitive to bruising, ability to stand up well to conditions of bulk transport, and an attractive appearance on ripening.

In regard to the seed aspect of the problem the difficulty is scientifically extremely complex for bananas are naturally reproduced by vegetative means. The plant breeder must first induce the formation of seeds and then, if he wishes, he must completely eliminate them again. A banana seed, which the great majority of banana-eaters in temperate countries have never seen, is about a quarter of an inch in diameter, black in color, and very hard. Naturally, the presence of these seeds in the fruit would not enhance its market value.

In attaining his present success, Prof. Cheesman has had to explore the whole genetics of bananas and the breeding work has necessitated the introduction and study of a wide range of varieties.

The Imperial College collection contains about one hundred "numbers" obtained from several parts of the Tropics. Tests have been made with all these during the effort to produce a specimen immune to Panama disease.

A Londoner by birth, Prof. Cheesman has been engaged in his research work at the Imperial College for the past ten years.

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PHYSICS

Radiations Have Small Energy Expenditures

RADIATIONS like X-rays or the gamma rays from radium that destroy harmful growths in the body, or sometimes do injury to normal tissues, accomplish their often revolutionary work with very small amounts of actual energy expenditure, says Prof. Friedrich Dessauer of Frankfurt-am-Main, Germany. A spoonful of hot tea brings more energy into the body in the form of heat than all the radiation reaching the inner tissues in a carcinoma treatment, he declares.

From this fact Prof. Dessauer infers that the work of such radiations is done practically at the instant of first impact, while they are still concentrated and before they have had opportunity to become dispersed into neighboring regions.

Assuming that the primary result of any radiation is regularly to set free an electron somewhere, Prof. Dessauer concludes that such an electron discharged from an atom and roaming around within a protein molecule should be expected to cause inner vibrations in it. This condition may be described by stating that the one individual molecule hit by the radiation has been raised to a higher temperature. Therefore Prof. Dessauer speaks of "point heat" as the actual cause of the devastating effects of radiation.

Science News Letter, July 15, 1933

PHYSICS—BOTANY

Electrical Detector For Rays From Living Cells

ELECTRICAL measurement of the so-called "M" rays or Gurwitsch rays, given off by living cells, has been accomplished by Dr. Boris Rajewsky, docent of the Institute for the Physical Foundation of Medicine at Frankfurt-am-Main. Biologists and physicists have long been trying to construct a device that would give a physical measurement of these mysterious radiations, but until now without success, and they have had perforce to continue measuring them by the old way of exposing other living cells to their action.

The Rajewsky apparatus is based on the principle of the Geiger counter, which is a device for detecting travelling electrons and other charged particles by letting them hit a wire and thus give an electrical "kick," amplified to detectable magnitude by a radio-like hook-up.

However, Dr. Rajewsky built several important modifications into his apparatus. Into the side of the tube through which the radiations were to be directed he set a quartz window, for the Gurwitsch rays are stopped by glass though they pass through quartz. The wire he covered with a semi-conducting material, to make it somewhat less sensitive. And between wire and window he installed a thin sheet of cadmium.

Cadmium is sensitive to rays of 3,000 Angstrom unit wavelength, which is the approximate amplitude of the Gurwitch rays. Whenever rays of this length fall on the metal, they release electrons, which in their turn electrically charge the air between the cadmium and the wire. Thus the cadmium becomes the means for the indirect expression of the Gurwitsch rays in electrical terms, and enables the experimenter to obtain a quantitative idea of their energy.

Science News Letter, July 15, 1933

GENETICS

Reward Study of Heredity Of Mental Disease

TWO PRIZES for original research on the inheritance of mental disorders are being offered by the Eugenics Research Association of Cold Spring Harbar, Long Island, N. Y. The amount of the first prize is $3000, that of the second is $1000. The contest closes July 1, 1935.

Probability of a given individual being committed to an institution for mental disease as a result of hereditary factors is the criterion on which the research must hinge.

The Society suggests that contestants select at random one member of a family, living in a community of 5,000 population, in which family there is a recorded history or tradition of about 100 members having suffered from mental disorder. White stocks only are to be studied. The contestant should then go back over the family history for about 100 years, noting the occurrence of mental disease and whether there was intermarriage in the family or marriage into other families in which mental disease occurred.

From this study and a knowledge of the law of heredity, the contestant should be able to predict whether or not the individual will probably be committed.

Science News Letter, July 15, 1933

IN SCIE

ZOOLOGY

Lively Young Marmosets Survive in Captivity

See Front Cover

TWO LIVELY, chattering young marmosets are growing up in San Francisco without the slightest notion of what "rare specimens" they are. They have a very great distinction of surviving birth in captivity.

Naturalists say that this type of New World monkey is often born in captivity but usually the captive mother has a perverse way of immediately neglecting her young and the tiny creatures have almost never been known to live.

The young brothers who escaped this fate are the offspring of a pair of marmosets brought to San Francisco from Nicaragua. The youngsters are now six months old and are half grown. Their parents are about as big as squirrels.

Marmosets are among the most primitive forms of the monkey family. They differ from ordinary monkeys in having sharp claws instead of nails on their fingers. Their long tails are not made for the usual monkey-use of swinging and grasping.

Science News Letter, July 15, 1933

PHYSIOLOGY

Keep Eyes off Skyline To Avoid Airsickness

DO NOT WATCH the horizon when you are in an airplane, if you want to avoid airsickness, or at least escape its worst effects. This advice was offered at the meeting of the American Society of Mechanical Engineers by Dr. L. H. Bauer of the Aeronautics Branch, U. S. Department of Commerce.

Although optical effects help to cause airsickness, they are not the only factors. The disturbances set up in the balancing organs of the inner ear are potent causes, but the pulls and sags of the muscles and vital organs, like those experienced in a suddenly moving elevator, apparently play no part in airsickness, Dr. Bauer said.

Science News Letter, July 15, 1933

EE FIELDS

MEDICINE

Iodine for Goiter May Produce Acne

A SKIN ERUPTION resembling the acne of adolescence may follow the use of iodine for goiter prevention, it appears from a note by Dr. Karl G. Zwick of Cincinnati to Science.

This iodide acne does not occur in everyone, but does occur in persons who already have an idiosyncrasy to iodine when they start taking it as a goiter preventive, or in persons who develop sensitiveness to it.

Iodide acne seems to occur more often since the drinking water of cities is chlorinated, Dr. Zwick has observed. This is not surprising, he explains, since all the halogens, the chemical group to which iodine and chlorine belong, are irritating to the glands of the skin.

Science News Letter, July 15, 1933

ENTOMOLOGY

Twelve-Legged Sea Spider Startles Scientists

A SEA SPIDER with six pairs of legs instead of the customary four pairs, was captured by Sir Douglas Mawson in the Antarctic during the British, Australian and New Zealand Expedition. It was found at a depth of 200 fathoms.

The discovery was announced at a meeting of the Royal Society by Dr. W. T. Calman, F. R. S., Keeper of Zoology at the British Museum, who is in charge of the work of examining Sir Douglas Mawson's specimens.

Dodecolopoda mawsoni, as the new species of animal is named, was exhibited at the Royal Society. The interest aroused among biologists is gauged by the fact that there are some 400 known species of marine arthropidae, or insects, with the standard four pairs of legs, corresponding to the three pairs of legs of land insects. The only previous exceptions to this apparent law of nature had five pairs of legs. The first of the ten-legged "freaks" was found off South Georgia by the American scientist, Eights, approximately a century ago. Though a few others have since been found the existence of twelve-legged pycnogonidae had not been suspected.

Dr. E. W. MacBride, F. R. S., professor of zoology at the Imperial College of Science, London, suggested that the extra number of legs "may have been added as an afterthought," in the same kind of way as the North American starfish, which originally had five rays and still drops from its larva in five-rayed form now has further rays that grow in between the primary five.

Both the ten-legged and twelve-legged arthropidae have been found in the Antarctic zone, suggesting that this environment may call for additional legs, possibly to facilitate food capture.

Science News Letter, July 15, 1933

NATIONAL PARKS

New National Parks Head Is Pioneer in Service

ALTHOUGH Horace M. Albright has resigned voluntarily as director of the National Park Service effective next month, the work of making the nation's areas of natural beauty educational and recreational assets to the public will continue under specialized, non-political personnel.

Arno B. Cammerer, associate director of the National Park Service since 1922, has been appointed director to succeed Mr. Albright.

Both Mr. Albright and Mr. Cammerer were closely associated with the late Stephen T. Mather, first director of the National Park Service, in organizing the great system of national parks and monuments that has been created since 1917.

As successor to Mr. Cammerer in the position of associate director, Arthur E. Demaray, now senior assistant director, has been appointed. Mr. Demaray is also a pioneer member of the service.

Mr. Albright is resigning to become vice-president and general manager of the United States Potash Company, operating mines and refineries at Carlsbad, New Mexico. He has served 21 years in the Department of the Interior.

Since 1929 when Mr. Albright became director, four new national parks and ten new national monuments have been established. These include: Carlsbad Caverns, Grand Teton, the Great Smoky Mountain National Parks and Morristown Historical Park.

Science News Letter, July 15, 1933

PSYCHOLOGY

Efficient Policemen Are Not "Dumb"

GOOD COPS are not "dumb." At least not in Duluth. Although the typical policeman in Duluth has completed only eight grades in school, tests show that he has an education equal to that of high school sophomores. Policemen rated as the most efficient on the force are superior in mental ability to 70 per cent. of gainfully occupied men.

The tests were given by the Employment Stabilization Research Institute in the course of a survey to find out the qualifications necessary for success in various occupations.

Efficient policemen are also superior in clerical ability, particularly in checking differences in numbers and names. They are not particularly superior in mechanical ability, although inferior policemen are also below the average man in this ability. The most efficient group is younger, on the average, than the less successful policemen, but individual differences in efficiency are far more important than age in the selection of good men for this job.

The typical Duluth policeman is native born, married, the owner of his home, and the father of two children.

Science News Letter, July 15, 1933

AGRICULTURE

Grasshopper Menace Will Reach Peak This Month

THE PLAGUE of grasshoppers threatening the small grain and forage crops of the western states will reach its peak during the latter part of this month, according to a report received by the U. S. Bureau of Entomology from Dr. J. R. Parker, scientist of the Bureau who has been making a field survey of the situation.

Minnesota will not fare as badly as surrounding states in that region because of the fact that adequate control campaigns have been organized there and farmers supplied with poison bait, which is the farmer's most effective weapon against the insect enemy.

In North Dakota, South Dakota, and eastern Montana the prospects are very bad, however. Hot, dry weather, has favored the development of the insects, producing great hordes which consume every green thing above ground.

Science News Letter, July 15, 1933

BIOLOGY-GEOLOGY

"Wallace's Line"

"A Classic of Science"

Lombock Strait, Fifteen Miles Wide, Separates Regions More Distinct Zoologically Than Any Others on Earth

PART ONE

ON THE ZOOLOGICAL GEOGRAPHY OF THE MALAY ARCHIPELAGO. By Alfred R. Wallace. Communicated by Charles Darwin. Read Nov. 3rd, 1859. Published in the Journal of the Proceedings of the Linnean Society (Zoology), Vol. IV. London: Longman, Green, Longmans and Roberts, and Williams and Norgate. 1860. This is an exact reprint of the original publication.

IN MR. SCLATER'S paper on the Geographical Distribution of Birds, read before the Linnean Society, and published in the "Proceedings" for February 1858, he has pointed out that the western islands of the Archipelago belong to the Indian, and the eastern to the Australian region of Ornithology. My researches in these countries lead me to believe that the same division will hold good in every branch of Zoology; and the object of my present communication is to mark out the precise limits of each region, and to call attention to some inferences of great general importance as regards the study of the laws of organic distribution.

The Australian and Indian regions of Zoology are very strongly contrasted. In one the Marsupial order constitutes the great mass of the mammalia,—in the other not a solitary marsupial animal exists. Marsupials of at least two genera (*Cuscus* and *Belideus*) are found all over the Moluccas and in Celebes; but none have been detected in the adjacent islands of Java and Borneo. Of all the varied forms of *Quadrumana, Carnivora, Insectivora* and *Ruminantia* which abound in the western half of the Archipelago, the only genera found in the Moluccas are *Paradoxurus* and *Cervus*. The *Sciuridae*, so numerous in the western islands, are represented in Celebes by only two or three species, while not one is found further east. Birds furnish equally remarkable illustrations. The Australian region is the richest in the world in Parrots; the Asiatic is (of tropical regions) the poorest. Three entire families of the Psittacine order are peculiar to the former region, and two of them, the Cockatoos and the Lories, extend up to its extreme limits, without a solitary species passing into the Indian islands of the Archipelago. The genus *Palaeornis* is, on the other hand, confined with equal strictness to the Indian region. In the Rasorial order, the *Phasianidae* are Indian, the *Megapodiidae* Australian; but in this case one species of each family just passes the limits into the adjacent region. The genus *Tropidorhynchus*, highly characteristic of the Australian region, and everywhere abundant as well in the Moluccas and New Guinea as in Australia, is quite unknown in Java and Borneo. On the other hand, the entire families of *Bucconidae, Trogonidae* and *Phyllornithidae*, and the genera *Pericrocotus, Picnonotus, Trichophorus, Ixos*, in fact, almost all the vast family of Thrushes and a host of other genera, cease abruptly at the eastern side of Borneo, Java, and Bali. All these groups are *common birds* in the great Indian islands; they abound everywhere; they are the characteristic features of the ornithology; and it is most striking to a naturalist, on passing the narrow straits of Macassar and Lombock, suddenly to miss them entirely, together with the *Quadrumana* and *Felidae*, the *Insectivora* and *Rodentia*, whose varied species people the forests of Sumatra, Java, and Borneo.

To define exactly the limits of the two regions where they are (geographically) most intimately connected, I may mention that during a few days' stay in the island of Bali I found birds of the genera *Copsychus, Megalaima, Tiga, Ploceus*, and *Sturnopastor*, all characteristic of the Indian region and abundant in Malacca, Java, and Borneo; while on crossing over to Lombock, during three months collecting there, not one of them was ever seen; neither have they occurred in Celebes nor in any of the more eastern islands I have visited. Taking this in connexion with the fact of *Cacatua, Tropidorhynchus*, and *Megapodius* having their western limit in Lombock, we may consider it established that the Strait of Lombock (only 15 miles wide) marks the limits and abruptly separates two of the great Zoological regions of the globe. The Philippine Islands are in some respects of doubtful location, resembling and differing from both regions. They are deficient in the varied Mammals of Borneo, but they contain no Marsupials. The Psittaci are scarce, as in the Indian region; the Lories are altogether absent, but there is one representative of the Cockatoos. Woodpeckers, Trogons, and the genera *Ixos, Copsychus*, and *Ploceus* are highly characteristic of India. *Tanysiptera* and *Megapodius*, again, are Australian forms, but these seem represented by only solitary species. The islands possess also a few peculiar genera. We must on the whole place the Philippine Islands in the Indian region, but with the remark that they are deficient in some of its most striking features. They possess several isolated forms of the Australian region, but by no means sufficient to constitute a real transition thereto.

Leaving the Philippines out of the question for the present, the western and eastern islands of the Archipelago, as here divided, belong to regions more distinct and contrasted than any other of the great zoological divisions of the globe. South America and Africa, separated by the Atlantic, do not differ so widely as Asia and Australia: Asia with its abundance and variety of large Mammals and no Marsupials, and Australia with scarcely anything but Marsupials; Asia with its gorgeous *Phasianidae*, Australia with its dull-coloured *Megapodiidae;* Asia the poorest tropical region in Parrots, Australia the richest: and all these striking characteristics are almost unimpaired at the very limits of their respective districts; so that in a few hours we may experience an amount of zoological dif-

ference which only weeks or even months of travel will give us in any other part of the world!

Moreover there is nothing in the aspect or physical character of the islands to lead us to expect such a difference; their physical and geological differences do not coincide with the zoological differences. There is a striking homogeneity in the *two halves* of the Archipelago. The great volcanic chain runs through both parts; Borneo is the counterpart of New Guinea; the Philippines closely resemble the equally fertile and equally volcanic Moluccas; while in eastern Java begins to be felt the more arid climate of Timor and Australia. But these resemblances are accompanied by an extreme zoological diversity, the Asiatic and Australian regions finding in Borneo and New Guinea respectively their highest development.

But it may be said: "The separation between these two regions is not so absolute. There *is* some transition. There *are* species and genera common to the eastern and western islands." This is true, yet (in my opinion) proves no transition in the proper sense of the word; and the nature and amount of the resemblance only shows more strongly the absolute and original distinctness of the two divisions. The exception here clearly proves the rule.

Let us investigate these cases of supposed transition. In the western islands almost the only instance of a group peculiar to Australia and the eastern islands is the *Megapodius* in Northwest Borneo. Not one of the Australian forms of Mammalia passes the limits of the region. On the other hand, Quadrumana occur in Celebes, Batchian, Lombock, and perhaps Timor; Deer have reached Celebes, Timor, Buru, Ceram, and Gilolo, but not New Guinea; Pigs have extended to New Guinea, probably the true eastern limit of the genus *Sus;* Squirrels are found in Celebes, Lombock, and Sumbawa; among birds, *Gallus* occurs in Celebes and Sumbawa, Woodpeckers reach Celebes, and Hornbills extend to the North-west of New Guinea. These cases of identity or resemblance in the animals of the two regions we may group into three classes; 1st, identical species; 2nd, closely allied or representative species; and 3rd, species of peculiar and isolated genera. The common Grey Monkey (Macacus cynomolgus) has reached Lombock, and perhaps Timor, but not Celebes. The Deer of the Moluccas seems to be a variety of the *Cervus rufus* of Java and Borneo. The Jungle Cock of Celebes and Lobbock is a Javanese species. *Hirundo javanica, Zosterops flavus, Halcyon collaris, Eurystomus gularis, Macropygia phasianella, Merops javanius, Anthreptes lepida, Ptilonopus, melanocephala,* and some other birds appear the same in the adjacent islands of the eastern and western divisions, and some of them range over the whole Archipelago. But after reading Lyell on the various modes of dispersion of animals, and looking at the proximity of the islands, we shall feel astonished, not at such an amount of interchange of species (most of which are birds of great powers of flight), but rather that in the course of ages a much greater and almost complete fusion has not taken place. Were the Atlantic gradually to narrow till only a strait of twenty miles separated Africa from South America, can we help believing that many birds and insects and some few mammals would soon be interchanged? But such interchange would be a fortuitous mixture of faunas essentially and absolutely dissimilar, not a natural and regular transition from one to the other. In like manner the cases of identical species in the eastern and western islands of the Archipelago are due to the gradual and accidental commingling of originally absolutely distinct faunas.

In our second class (representative species) we must place the Wild Pigs, which seem to be of distinct but closely allied species in each island; the Squirrels also of Celebes are of peculiar species, as are the Woodpeckers and Hornbills, and two Celebes birds of the Asiatic genera *Phaenicophaeus* and *Acridotheres.* Now these and a few more of like character are closely allied to other species inhabiting Java, Borneo, or the Philippines. We have only therefore to suppose that the species of the western passed over to the eastern islands at so remote a period as on one side or the other to have become extinct, and to have been replaced by an allied form and we shall have produced exactly the state of things now existing. Such extinction and such replacement we know has been continually going on. Such has been the regular course of nature for countless ages in every part of the earth of which we have geological records; and unless we are prepared to show that the Indo-Australian Archipelago was an altogether exceptional region, such must have been the course of nature here also. If these islands have existed in their present form only during one of the later divisions of the Tertiary period, and if interchange of species at very rare and distant intervals has occurred, then the fact of some identical and other closely allied species is a necessary result, even if the two regions in question had been originally peopled by absolutely distinct creations of organic beings, and there had never been any closer connexion between them than now exists. The occurrence of a limited number of representative species in the two divisions of the Archipelago does not therefore prove any true transition from one to the other.

QUITE DIFFERENT ANIMALS

live on the two sides of the line Wallace drew through the cluster of islands between Asia and Australia. Those on one side are similar to the Australian fauna. Those on the other must look to the mainland of Asia for their nearest relatives.

The examples of our third class—of peculiar genera having little or no affinity with those of the adjacent islands—are almost entirely confined to Celebes, and render that island a district *per se,* in the highest degree interesting. *Cynopithecus,* a genus of Baboons, the extraordinary Babirusa and the singular ruminant *Ansa depressicornis* have nothing in common with Asiatic mammals, but seem more allied to those of Africa. A quadrumanous animal of the same genus (perhaps identical) occurs in the little island of Batchian, which forms the extreme eastern limit of the

highest order of mammalia. An allied species is also said to exist in the Philippines. Now this occurrence of quadrumana in the Australian region proves nothing whatever as regards a transition to the western islands, which, among their numerous monkeys and apes, have nothing at all resembling them. The species of Celebes and Batchian have the high superorbital ridge, the long nasal bone, the dog-like figure, the minute erect tail, the predaceous habits and the fearless disposition of the true Baboons, and find their allies nowhere nearer than in tropical Africa. The *Anoa* seems also to point towards the same region, so rich in varied forms of Antelopes.

In the class of birds, Celebes possesses a peculiar genus of Parrots (Prioniturus), said to occur also in the Philippines; *Meropogon,* intermediate between an Indian and an African form of Bee-eaters; and the anomalous *Scissirostrum,* which Prince Bonaparte places next to a Madagascar bird, and forms a distinct subfamily for the reception of the two. Celebes also contains a species of *Coracias,* which is here quite out of its normal area, the genus being otherwise confined to Africa and continental India, not occurring in any other part of the Archipelago. The Celebes bird is placed, in Bonaparte's "Conspectus," between two African species, to which therefore I presume it is more nearly allied than to those of India. Having just received Mr. Smith's Catalogue of the Hymenoptera collected during my first residence in Celebes, I find in it some facts of an equally singular nature. Of 103 species, only 16 are known to inhabit any of the western islands of the Archipelago, while 18 are identical with species of continental India, China, and the Philippine Islands, two are stated to be identical with insects hitherto known only from tropical Africa, and another is said to be most closely allied to one from the Cape.

These phenomena of distribution are, I believe, the most anomalous yet known, and in fact altogether unique. I am aware of no other spot upon the earth which contains a number of species, in several distinct classes of animals, the nearest allies to which do not exist in any of the countries which on every side surround it, but which are to be found only in another primary division of the globe, separated from them all by a vast expanse of ocean. In no other case are the species of a genus or the genera of a family distributed in *two* distinct areas separated by countries in which they do not exist; so that it has come to be considered a law in geographical distribution, "that both species and groups inhabit continuous areas."

Facts such as these can only be explained by a bold acceptance of vast changes in the surface of the earth. They teach us that this island of Celebes is more ancient than most of the islands now surrounding it, and obtained some part of its fauna before they came into existence. They point to the time when a great continent occupied a portion at least of what is now the Indian Ocean, of which the islands of Mauritius, Bourbon, &c., may be fragments, while the Chagos Bank and the Keeling Atolls indicate its former extension eastward to the vicinity of what is now the Malayan Archipedago. The Celebes group remains the last eastern fragment of this now submerged land, or of some of its adjacent islands, indicating its peculiar origin by its zoological isolation, and by still retaining a marked affinity with the African fauna.

Science News Letter, July 15, 1933

RADIO

NO ONE NEED HAVE SCARLET FEVER

an address by

Dr. Gladys H. Dick

The McCormick Institute for Infectious Diseases

To be given Friday, July 21, at 1:45 p. m. Eastern Standard Time over stations of the Columbia Broadcasting system. Each week a prominent scientist speaks over the Columbia System under the auspices of Science Service.

ENGINEERING

30,000-Ton Rock Worried Prehistoric Engineers

A 30,000-TON rock that worried prehistoric Indians in Chaco Canyon 900 years ago has been examined by modern engineers and pronounced safe enough not to worry about. It is too late to help the Indians, but modern tourists who come to see the Indian ruins can feel safe.

A towering rock 100 feet high stood at the back wall of Pueblo Bonito, one of the larger and more important pueblos of about 1000 A. D, and the people of the town evidently thought it precariously unstable. Using primitive engineering tactics, they tried to brace it with a masonry wall along the foot.

Discussing the engineering problems involved, in a report to the *Engineering News-Record,* J. B. Hamilton and F. A. Kittredge, engineers of the National Park Service, say that the Indian tactics would never have stopped the tall rock from overturning, had it been really unstable. However, the wall they built did ably protect the base of the rock from eroding away by wind action.

The engineers of the Park Service have surveyed the place and find that, while the rock is extensively undercut, it is so stable that only an earthquake could be expected to dislodge it. The problem, they concluded, is to protect it against wind erosion and frost action. Their tactics will be to build a masonry wall, the same remedy that the Indian engineers decided on, back in 1000 A. D.

Science News Letter, July 15, 1933

BOTANY

Warms Sap to Find Its Rate of Flow

HOW fast sap rises in trees and smaller plants has always been one of the toughest of the botanists' problems. And it is of great practical importance, too, in all applications of the science, from forestry to farming under irrigation. All methods hitherto in use have involved injuring the plant in some way, by boring holes in it or injecting foreign substances, and to that extent introducing unnatural conditions with the risk of falsifying the result.

But now Prof. Bruno Huber, of the Darmstadt Technical University, has devised a way to measure the speed of the transpiration stream in plants without injuring them. He wraps a wire

around the stem and heats it electrically for several seconds, which causes the temperature of the sap to rise by fractions of a degree. A few inches higher up the passage of the heated sap is registered by a tiny electrical thermometer which can be introduced between bark and wood without doing any harm.

This method, of course, is efficient only if the sap flows more quickly than it loses its heat, which is the case when the speed is more than one-half an inch a minute.

In this way it is easy to observe the daily speed fluctuations in one and the same plant throughout the year. For instance, Prof. Huber found that the sap in a vine moved with a speed of 30 inches an hour between 6 and 7 o'clock in the morning, that at 1 o'clock the speed rose to approximately 28 feet an hour and fell again to about 30 inches an hour at night.

In the case of conifers, the condition that the sap should move more quickly than it loses its heat is not fulfilled, so that measurements are impossible. But in the case of foliage trees he found speeds from the measurable minimum up to 36 feet per hour, with vines even up to 150 feet per hour.

Science News Letter, July 15, 1933

PHYSICS

Electrical Gage Measures Springy Rubber Articles

PRECISE measurements of the dimensions of rubber slabs and cylinders are now possible by means of what might be termed a set of electrical gages developed by W. L. Holt of the National Bureau of Standards. It is obvious at once that the measurement of the thickness of a compressible substance like rubber would be rather inaccurate with the ordinary screw micrometer due to the difficulty of telling when the spindle and foot of the instrument just make contact with the surface of the material without pressing into it.

The new devices make use of the principle of the screw micrometer but substitute a "presser foot" with a spherical surface for the ordinary foot which is plane. When the contact surface of this presser foot is forced down by the specimen of rubber due to the pressure of the spindle acting on the upper surface, it makes contact in an electrical circuit thus causing the needle of a galvanometer in front of the operator to deflect. The indentations in the rubber made by the presserfoot are said to be practically zero so that no errors creep in from this cause.

For measuring the width of the rubber slab or the diameter of a rubber cylinder another gage has been built which operates, with slight modifications, on the same principle as the gages for measurement of thickness just described.

Measurements made with these electro-micrometer gages compare well with those determined from computation of the volume of the specimens as well as those obtained with the usual types of dial gages. It is expected that the new device will be a boon to the rubber technologist who must know the exact dimensions of the specimens he is testing if his results are to mean anything.

Science News Letter, July 15, 1933

PHYSICS

Magneto-Optic Method Measures Minute Amounts

NOT ONLY can the presence of minute traces of chemical elements be detected in a solution by means of the magneto-optic method, but how much of each can be estimated, Dr. Edna R. Bishop of the Alabama Experiment Station, Auburn, Ala., told the American Association for the Advancement of Science.

The magneto-optic method was invented by Prof. Fred Allison of Alabama Polytechnic Institute, and depends on the fact that if a beam of polarized light is shot through a solution, and a powerful magnetic field then suddenly applied, the direction of the wave-fronts of the light is twisted out of line.

The use of this method for quantitative analysis, Dr. Bishop said, has the advantage of great sensitiveness, of being able to pick out any desired element without troublesome preliminary separations, and of not changing the original sample to be analyzed in any way.

Science News Letter, July 15, 1933

NATURE RAMBLINGS by Frank Thone

ORNITHOLOGY

Yankee Mockingbird

THE MOCKINGBIRD is the chief boast of all southern birddom, and justly so. He is an excellent songster, with an exceedingly varied repertoire.

But though the North is not blessed with the mockingbird, it has an almost equally talented cousin of his, in the catbird. The mockingbird and the catbird look a good deal alike, being slim, long-tailed birds of a general gray color scheme, and they have the same habit of ducking in and out among the branches when you try to get a good look at them; not flying away, but keeping inconvenient bunches of leaves between themselves and the observer.

The cousinship is most clearly traced through the catbird's song. This mockingbird of the North has an assortment of notes of his own, and of imitations of other sounds, that fairly rivals the stock of his more widely reputed cousin in Dixie. There are even some loyal Yankees who prefer the catbird. And indeed if it were not for the mewing call he sounds when excited or alarmed, the catbird might well have been formally named the Northern Mocker.

That catcall is the most realistic imitation in nature, though it is not a deliberate imitation. Catbirds were using it long before white men came to America and brought their pets with them. But is is so much like the voice of a somewhat distressed kitten that it will fool even a cat.

But let no cat presume on a similarity of language and try and get familiar. The catbird, like the mockingbird, has a decidedly combative streak, and will turn himself into a low-flying, strafing combat plane if anybody, no matter how big, gets too close to his nest.

Science News Letter, July 15, 1933

GENERAL SCIENCE

German Nationalism Danger To World's Great Scientists

Forbidding Eminent Intellectuals to Exercise Talents Is Grave Injustice, Says British Science Journal

THE WAVE of intellectual intolerance now engulfing Germany endangers some of the world's greatest scientists. From those nations which are still intellectually free, there come protestations in the form of denials of the scientific validity of the Nazi claims and the organization of practical help for the German scientific refugees.

In a leading article, the British scientific journal, "Nature," summarizes as follows scientific opinion on the German situation:

"Germany, responding to the call of patriotic emotion—as she has more than once before, but never with such abandon—would appear to have handed herself over body and soul to Herr Hitler. Acting on a given view of history and a prescribed theory of racial and national regeneration, she seeks to purge herself of elements felt to be inimical or to stand in the way of the realization of his ideal.

"A new communism, imposed by force, but accepted widely if not yet universally, with an enthusiasm which appears to have crossed the bounds of fanaticism, bids fair to reduce the whole of Germany as nearly as is humanly possible to one common denominator and to block every angle of vision but one in her political and intellectual kingdoms alike.

Ethnological Facts Edited

"Both historian and anthropologist may look askance at the Hitlerian view of racial history and psychology as suspect in origin. They may dismiss with a smile the 'Aryan' claim to exclusive rights in the swastika. It is not the first time that ethnological facts have been 'edited' to bolster political aspiration or flatter national vanity; nor will it be the last. If, in electing to remould herself as an organised State, Germany has chosen to rely on the hypnotic effect of a pseudo-scientific theory now exploded—an instrument which may break in her hand—that is her affair and concerns no one but herself.

"In expelling from public life those who, on racial or political grounds, are regarded as beyond the pale, Germany, by her own act, deprives herself of the services of some of her most eminent intellectuals. These are men prominent in the arts and sciences, in public life, in the professions and in education, who have raised and maintained her in the foremost ranks of intellectual achievement among the nations. This may well seem a blunder, at which the whole civilized world stands aghast, a misreading of history and a fatal misinterpretation of the conditions of progress in a modern society, in which, in these days of fierce competition, every resource of science is pressed into the service of social and commercial advancement. Yet even such action as this, although it has its international aspect, as a domestic matter, it is held, does not concern the outside world.

Intellectual Companionship Difficult

"But in forbidding men of German nationality, who have served their country loyally in peace and war, to exercise their talents, and in depriving them of the means of livelihood, Germany has been guilty, in the eyes of the world, of an act of grave injustice, which has made intellectual companionship with her difficult."

Science News Letter, July 15, 1933

MEDICINE

Swiss Adds Iodine to Garden To Prevent Goiter in Family

A SWISS physician, Dr. H. Hunziker, has had potassium iodide added to the fertilizer for the garden which supplies his family with vegetables. The object was to insure a sufficient supply of iodine to prevent the development of goiters in his children. Lack of iodine in the Swiss soil and water is responsible for a large number of goiters among the people of that country.

This physician's experiment was a significant contribution to scientific knowledge of how to prevent goiter, Dr. Karl G. Zwick of Cincinnati pointed out in a note to the current issue of Science.

Dr. Hunziker kept records of the circumference of the neck in the region of the thyroid gland in his own five children and in five other children who ate vegetables raised on soil which was not iodized. These records showed plainly that the iodine prevented the development of goiter. One of the girls in the control group who ate non-iodized vegetables after two and one-half years asked to be treated for a rapidly enlarging goiter.

Very minute amounts of iodine are sufficient to prevent the development of this type of goiter, Dr. Zwick pointed out. The Swiss physician, Dr. Hunziker, did not determine the amount of iodine in his vegetables which prevented the development of goiter in his children. He added in one year 17 grams of potassium iodide to 1,200 square meters of soil. This would be about an ounce to two-thirds of an acre. The next year he used slightly more of the iodide.

One to 100,000,000

As little as one part of sodium iodide in 100,000,000 parts of water is sufficient to prevent goiter, two other investigators, Drs. J. F. McClendon and J. C. Hathaway have found.

Turnips grown in iodine treated soil had 441 parts per billion of the iodine in the roots, and 950 parts per billion in the tops, Drs. A. B. Beaumont and George M. Karns recently reported. Turnips grown in soil treated with chloride instead of iodine had 165 parts per billion of iodine in the roots and 441 parts per billion in the tops, showing the large relative increase in iodine content in this vegetable when it is grown in soil to which iodine has been added.

Science News Letter, July 15, 1933

ASTRONOMY

Densest Star Found Brighter Than Formerly Supposed

New Determination Shows Companion of Sirius To Be Almost As Brilliant as Naked-Eye Stars

THE strange companion of Sirius, the dog-star, which is so dense that a cubic inch of stuff of which it is made would weigh 25 tons if a piece could be transported to the earth's surface, is about three times as bright as astronomers have previously supposed.

Dr. A. N. Vyssotsky, of the Leander McCormick Observatory of the University of Virginia, has recently completed a new determination of the brightness of this remarkable little star. A full account of his researches appears in the Astrophysical Journal, published by the University of Chicago Press.

Though Sirius B, as the companion is called, is not very much fainter than stars that can be seen with the naked eye, it is very difficult to observe because of its proximity to Sirius, brightest of all the stars in the sky. Even with telescopes powerful enough to reveal it easily, measurements of its brightness are complicated by Sirius' overpowering glare.

The new method employed by Dr. Vyssotsky makes use of the fact that when a grafting of fine parallel wires is placed over the lens of a telescope, and a star photograph taken, the image of the star is accompanied on either side by a series of images of its spectrum. The closer the wires, the more spread out are the spectral images.

Dr. Vyssotsky placed such a grafting over the 26-inch lens of the McCormick Observatory's telescope and photographed Sirius and the companion. The arrangement of the wires was chosen so that the first spectral images were just as far from Sirius as the companion's image. On the resulting plate appears the main star image spread out into a small disc because of the star's brilliance. On either side are the images of the spectrum, looking very much like the image of the companion, just below.

The brightness of such a spectrum image, in relation to the star itself, can be calculated, and thus Dr. Vssyotsky found how bright the images should appear. But they, like the image of Sirius B, are affected by proximity to the bright star. In this way he found how much of an effect the glare of Sirius produced, and when this correction was applied to the measured brightness of the image of the companion, he found its magnitude to be 7.25, instead of 8.44, which has previously been accepted.

This determination was checked in another way, by making double exposures, in the same way that a movie camera man can photograph an actor talking to himself. The plate was first exposed on a very bright star, and then exposed again on a cluster of faint stars, one of which came close to the bright one, and thus played the part of the companion. The brightness of the faint star was then determined separately, and the effect of the glare measured. This method gave a value for the magnitude of Sirius B as 6.91. The mean of the two determinations is 7.1, which Dr. Vyssotsky adopts as the best value for the brightness of Sirius B. With the naked eye, under good conditions, stars as faint as the sixth magnitude can be seen.

Science News Letter, July 15, 1933

ARCHAEOLOGY

Alabama Expedition Finds 40 Unknown Indian Sites

FORTY heretofore unknown sites where Indians once had their homes and villages have been discovered in Alabama by a party of scientists headed by Dr. Walter B. Jones, director of the Alabama Museum of Natural History and state geologist.

The expedition, which has returned to the University of Alabama, spent two weeks traveling by water through counties of northwestern Alabama. One bluff shelter, previously known and partly explored by the owner of the land, David Barger, was further investigated and some of the bones of the ancient occupants were found. The shelter had been used by two young adults, a child, and an infant.

Several thousand specimens of beetles, some already recognized as new to science, were obtained by naturalists of the expedition.

Science News Letter, July 15, 1933

SEISMOLOGY

Earthquake Shakes Aleutian Islands

THE ALEUTIAN Islands in the vicinity of Unalaska Island felt the force of the earthquake of Wednesday (June 28, 6:35 p. m. E.S.T.) that was recorded on seismographs. Telegraphic reports to Science Service from seismological observatories were used by the U. S. Coast and Geodetic Survey to locate the epicenter as 53 degrees north latitude 167 degrees west longitude. The Jesuit Seismological Association at St. Louis located the epicenter's longitude three degrees farther west. Honolulu, Georgetown University, Fordham University, St. Louis University, were the seismological stations reporting.

Science News Letter, July 15, 1933

The History of Staining

A series of papers on the History of Staining which has been appearing in Stain Technology from 1928 to 1933 is to be published in book form about October 1, 1933. This book also includes full-page portraits and biographical sketches of nine men prominent in the development of staining technic.

The price of the book is to be $2.00, but a special pre-publication price of $1.50 is offered until the fifteenth of October, provided orders are accompanied by cash or by official orders from educational or scientific institutions.

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•First Glances at New Books

Psychiatry

FORTY YEARS OF PSYCHIATRY—William A. White—*Nervous and Mental Disease Publishing Co.*, 154 p., $3. This unusually interesting book tells the development of modern methods of treating nervous and mental diseases. But the book is no dry record of facts. It is a vivid picture of the author's wide personal experiences in this field of medicine. Dr. White has been superintendent for thirty years of Saint Elizabeths Hospital, the government institution for nervous and mental diseases, and has himself played a large and important part in the development of modern psychiatry and the mental hygiene movement.

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Engineering

THE ENGINEER'S MANUAL OF ENGLISH—W. O. Sypherd and Sharon Brown—*Scott, Foresman and Company*, 515 p., $2. Practical advice and first aid to better reports and article writing by engineers. Such a handbook deserves a place upon the engineer's reference shelf alongside the technical handbooks of engineering specialties.

Science News Letter, July 15, 1933

Hygiene

THE VISUAL FATIGUE OF MOTION PICTURES—Comp. and ed. by Aaron E. Singer—*Amusement Age Publishing Co.*, 48 p., $1. This small brochure gives a summary of opinions on a subject of considerable general interest. There is also a survey of the literature and research conclusions to date.

Science News Letter, July 15, 1933

Mathematics

MATHEMAGIC—Royal Vale Heath—*Simon and Schuster*, 138 p., $1.75. A member of the Society of American Magicians uses mathematics as the theme of a book of parlor and dinner party tricks. Mathematicians will be interested in working out the proof and theory of the "magic" presented.

Science News Letter, July 15, 1933

Architecture

ARCHITECTURAL PLANNING OF THE AMERICAN COLLEGE—Jens Frederick Larson and Archie MacInnes Palmer—*McGraw-Hill*, 181 p., $2. This volume is a part of the fine arts program of the Association of American Colleges and it is an outgrowth of an architectural advisory service which that organization has for the past several years been maintaining for the benefit of its member colleges. Well illustrated, the volume discusses character in college architecture and the planning of campus and buildings.

Science News Letter, July 15, 1933

Engineering-Education

VOCATIONAL GUIDANCE IN ENGINEERING LINES—American Association of Engineers—*Mack Printing* Co., 521 p., $2.50. A solid, factual book issued in order that those contemplating entering the engineering profession will know what they are tackling The sixty chapters summarize the varieties of engineering and each chapter is written by an expert.

Science News Letter, July 15, 1933

Psychology

PSYCHOLOGY—Frederick H. Lund—*Ronald Press*, 475 p., $3.00. A college textbook written by the professor of psychology of Temple University and included in the Psychology Series edited by Dr. A. T. Poffenberger, of Columbia, this book charts the trends of recent empirical and biological psychology. As its subhead indicates, it is "An Empirical Study of Behavior" and it treats with much thoroughness the constitutional and structural features which are basic to behavior as well as the study of human behavior and adjustment.

Science News Letter, July 15, 1933

Sociology—Agriculture

LAND SETTLEMENT AS A RELIEF MEASURE—R. W. Murchie—*University of Minnesota Press*, 32 p., 25c.

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Zoology

A CHECK LIST OF NORTH AMERICAN AMPHIBIANS AND REPTILES—Leonhard Steineger and Thomas Barbour—*Harvard University Press*, 185 p., $4. Third edition.

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Micropaleontology

A MANUAL OF FORAMINIFERA—J. J. Galloway—*Principia Press*, 483 p., $6.50. The study of Foraminifera is becoming increasingly important in solving geological problems in oil fields.

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Geography

A HISTORY OF GEOGRAPHICAL DISCOVERY 1400-1800 — James Edward Gillespie—*Henry Holt*, 111 p., $1. A brief survey of the early voyages of discovery, searching for the Indies and Cathay, exploring the American continent and voyaging to the Arctic Seas and the Pacific. The author is professor of modern European history in the Pennsylvania State College.

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General Science

ACTUALITÉS SCIENTIFIQUES ET INDUSTRIELLES—*Hermann et Cie, Paris.* The following numbers have appeared: La Coordination des Atomes dans la Molécule, La Symbolique Chimique, G. Urbain, part 1, 51 p. 12 fr., part 2, 54 p., 12 fr.; Spectres d' Absorption Visibles et Ultra-Violets des Solutions, M. Chatelet, 24 p., 7 fr.; La Structure de la Cellulose dans ses Rapports avec la Constitution des Sucres, G. Champetier, 28 p., 8 fr.; Premiers Essais de Cinématographie Ultra-Rapide, M. A. Magnan, 26 p., 15 fr.; Cinématographie Jusqu'a 12000 Vues par Seconde, A. Magnan, 19 p., 15 fr.; Le Vol au Point Fixe, A Magnan and A. Sainte-Laguë, 30 p., 10 fr.; Influence des Facteurs Électriques sur la Végétation, Néda Marinesco, 27 p., 7 fr.; L'Inflammation et la Combustion Explosive en Milieu Gazeux, M. Prettre, 60 p., 15 fr.; Les Phénomènes Biologiques dans le Cadre des Sciences Exactes, Théophile Cahn, 20 p., 6 fr.; Les Sciences Géologiques et la Notion d'État Colloïdal, Pierre Urbain, 60 p., 8 fr.

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Geology

ATLAS OF AMERICAN GEOLOGY—Comp. by A. K. Lobeck—*Geographical Press, Columbia University*, 100 p., $1.55 bound, $1.25 unbound, loose leaf cover, 15c additional. Containing diagrams, maps and other illustrations selected from a wide variety of sources, this atlas provides practical illustrative material for lectures and round table discussions, for laboratory use and home study, and for general reference purposes.

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